THE PERVERSION OF FORCES IN AND ABOUT THE ORAL CAVITY.*

By DR. B. FRANK GRAY, Colorado Springs.

I come to you as an Orthodontist to talk on a subject about which some of you know nothing. A good many of you know something of it, while a few of you know a great deal about it.

As you go up and down the streets of Los Angeles, you will observe multitudes of children with inharmonious features, distorted faces, poor physique, anemic and ill-nourished. What you see in our own city is to be seen in every city, town and hamlet in the country.

Among the factors which operate to bring about these undesirable conditions, a tremendous percentage is due to causes in which the physician and the orthodontist are mutually interested. The physician is constantly being called upon to remove adenoids and tonsils, to treat deflected nasal septa and all the pathological conditions of the nasal tract. How many physicians realize the great importance of the teeth in just such cases? You can no more hope to meet with success in your work if you disregard the vital bearing the teeth have in the matter, than can the orthodontist hope to meet with success if he neglects the matter of the obstructed nose. And while my paper deals principally with those cases of dental irregularity associated with an obstructed respiration, I want to say that maloccluded teeth, arising from whatever cause, is a most serious handicap to the individual.

Certainly science has progressed far enough to make it evident that good health pre-supposes a good digestion and assimilation of food, and this in turn, requires the thorough mastication of food. With irregular, or maloccluded teeth, this is utterly impossible. Insofar as there is a departure from the normal arrangement of the teeth, just that far from a normal standard of efficiency will be the mastication of food. With many people the arrangement of the teeth is such that anything like efficient mastication is wholly out of the question.

Causes of dental irregularity are numerous. Some of the important ones may be stated as: premature loss of the deciduous teeth; loss of the permanent teeth; imperfect dental operations; prolonged retention of the deciduous teeth; supernumerary teeth; disuse; abnormal habits of lip and tongue and thumb-sucking; nasal obstructions, etc. (Angle.)

The skilled orthodontist can bring about correction of the irregularly arranged teeth, no matter what cause has operated to produce the condition. But the conscientious operator is much concerned about the permanence of his operation, and there is one type of malocclusion which perplexes us more in the aggregate than all others combined. It will be chiefly considered in this paper.

Now I wish to call your attention to the normal occlusion of the teeth. (Fig. 1.) All dentists and medical men should know this arrangement.

Has not Nature provided wisely in this beautiful dental apparatus? Note the simplicity of it all, and yet see how all the surfaces of each tooth are brought into play in mastication!

SOME FORCES GOVERNING THE OCCLUSION OF THE TEETH.

We have in the beautiful and efficient system of the interlocking of the cusps of the teeth, alone,

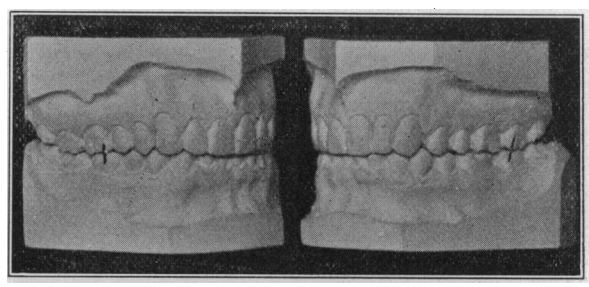

Fig. 1. An example of occlusion which approximates the normal.

a great factor looking to the permanent maintenance of the normal,—provided normality exists in a given case. Certainly it is true that one of the best guaranties of maintaining order and harmony in this branch of medicine, as in other branches, is that we shall first have a condition of harmony established. But there are other factors,—other forces if you please, which have to do with the occlusion of the teeth, with the health of the individual, with the symmetry and beauty of the face. Given as an example, an individual possessing beautiful teeth, normally arranged as indicated, their integrity of arrangement does not remain so simply because of the perfect interlocking of cusp with cusp. These wonderful dental organs, which mean so much to their possessor, are, in reality, being actually balanced and held in their proper relations by muscular forces. The buccinator and the orbicularis oris muscles normally maintain a constant pressure from without upon the teeth, and upon the maxillary bones which carry the teeth. This force, while not so great, as measured in degrees of stress, because of its constancy becomes a factor of tremendous importance.

I have considered the harmonious way in which the teeth of the upper and lower arch are related,

* Read before a joint meeting of the Los Angeles County Medical Society and the Los Angeles County Dental Society, 1912.

how they interlock with such efficiency and beauty. Then, too, I have considered the muscular forces operating *from without* upon the dental arches. But if that were all, we might reasonably expect the arches would become narrowed from this anterior pressure. However, there is a strong muscular pressure from *within*. The tongue, when normally at rest, completely fills the oral cavity, causing constant and equal pressure from within upon the teeth of both the upper and lower jaw. Like the exterior pressure, this interior pressure, because of its constancy, becomes a great factor in maintaining the integrity of the normal dental mechanism.

I have touched briefly upon what may be expected under *normal* conditions.

The question which I wish to bring to the attention of the medical profession with as much

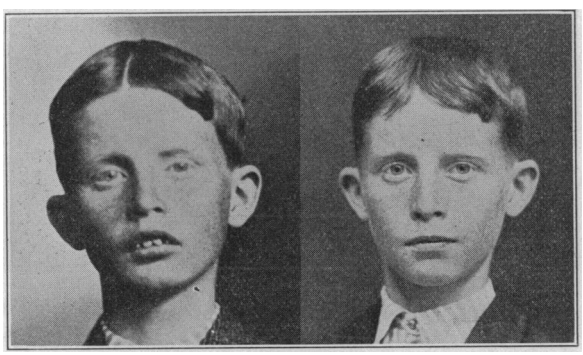

Fig. 2. Typical Mouth-breather Class II, Division I Malocclusion. "Adenoids" removed and Malocclusion corrected.

force as possible, is, *The Perversion of the Normal Forces* governing the harmony and balance of this same dental apparatus, and in order to do so, I will consider tissues quite within the realm of the physician and rhinologist.

No single class of malocclusion of the teeth causes greater facial deformity than that known as "Class II, Division I," of the Angle Classification. Out of one thousand cases of dental irregularity. Dr. Angle has found approximately ninety cases corresponding to this classification. Here we have, as the chief causative factor, mouth-breathing. Figures 2, 3 and 4 illustrate a rather extreme case of this type.

Mouth-breathing arises from occlusion of the nasal passage, whether the cause be hypertrophy of the lymphoid tissue in the dome of the pharynx (so-called adenoids), deflection of the nasal septum, or pathological conditions of the lining membrane of the nose. If the cause be hypertrophied lymphoid tissue, the posterior nares may be partially or wholly occluded. If other causes are operative, mouth-breathing is likely to correspond, in degree, to the extent of the obstruction present. The child is thus forced to breathe through the mouth a part or all the time. If the obstruction is only partial, he may keep the lips closed during the day time, while at night he is apt to sleep habitually with the mouth open, breathing through that channel instead of through the nose as Nature intended.

Having in mind my explanation of the muscular forces which are constantly operative to maintain the normal balance and occlusion of the teeth, I feel sure you will quickly appreciate how mouth-breathing starts a perversion of this muscular force. No longer does the upper lip bring its normal pressure to bear upon the anterior teeth (incisors and cuspids) of the *upper dental* arch. These teeth protrude, in many instances, and to such an extent that the lip may only be drawn over them with great effort. On either side of the mouth there is a peculiar pull downward, of the muscles. This retards the lateral development of the arch, and presently it is abnormally narrow. With the air current passing over the tongue, that organ lies at the bottom of the oral cavity, so that its muscular influence is not exerted normally against the teeth of the upper arch, and probably *abnormally* against the teeth of the lower arch, while the lack of use of the nose in the act of respiration, results in a lack of development of that organ, especially downward.

Such are some of the causes which account for the so-called V-shaped, or high arch. The open mouth, and the peculiar pull of the muscles, causes the molar teeth of the lower arch to occlude with the upper teeth in a relation distal to normal. The characteristic weak and undeveloped chin follows. Development of the face, including the nose, the teeth, etc., normally proceeds downward and forward, as has been so well shown by Dr. Frederick B. Noyes, the prominent orthodontist and histologist.

What facial deformity is worse than that arising in the way I have outlined? Certainly none, unless it be that of such a congenital condition as hare-lip, or some post-natal loss of the tissues of the face, resulting from accident or disease.

How far-reaching must be the deformity resulting from malocclusion, in its influence upon the life of the individual thus afflicted! Think of the mortification the sensitive child suffers as he is taunted by his playmates, and as he grows older he appreciates more and more the handicap under which he labors. Indeed, it may mean the changing of the whole current of his life. Aside from the deformity itself, he is constantly breathing through the mouth, and the inspired air does not receive its proper straining, warming and moistening, as would be true if normal breathing was the rule. Herein may lie the cause of serious impairment of the health, the physicians tell us: liability to infection, etc. The efficiency of the masticating apparatus is greatly impaired, and thus the nutrition of the body suffers.

I should interject here the important fact, that while mouth-breathing is the cause of dental irregularity, *malocclusion of the teeth is a pronounced factor in causing mouth-breathing to persist.* With the lips held forcibly apart by the mal-arranged teeth, *mouth-breathing will continue even though a free nasal passage exists.* Here orthodontic services are of vital importance. In some cases the adenoids or other nasal obstructions may cease to operate as the cause of abnormal respiration, but the malocclusion which has followed in the wake of the nasal obstruction, has become the *chief* factor in the abnormal respiration. Writers of medical books, even of recent publication, ignore the necessity of correcting the occlusion of the teeth as a remedial measure in such cases. I have in mind such an omission in a rather recent work by Doctor Osler.

But even though the orthodontist render efficient services (and here is one of the most vital things of my paper) unless the physician or rhinologist

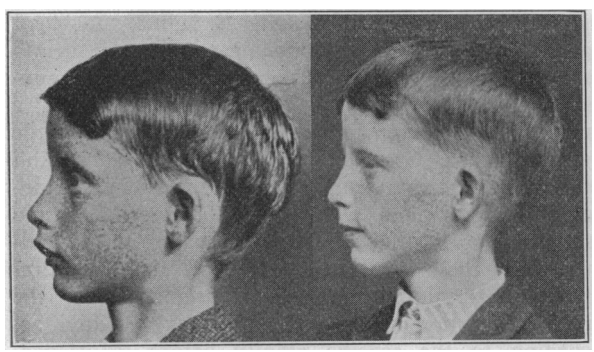

Fig. 3.

masters his part of the work, our painstaking work, covering many months, and even years of time (including the moving of the teeth and their proper retention), may largely go for naught. We are all liable to error, and sometimes inefficiency, but the instances continue to multiply wherein the physician pronounces our patient free of nasal obstruction, *and yet he is a persistent mouth-breather!* Again, children are operated upon for adenoids and possibly tonsils: their nasal passages are declared to be free. They continue to breathe through the mouth in spite of all that is done for them. The orthodontist advises the parent as to suitable means of forcibly holding the mouth closed at night. Sometimes this seems to be effective, oftener not. We are driven to several conclusions: that frequently the obstruction is *not* thoroughly removed (and we can see the difficulties of the technic of the work, too!). So, if we dare, we would be charitable, but there is so much at stake that we can scarcely be so. Then we feel so sure of the skill of some operators in this field of work,—so sure of their thoroughness,—that we are satisfied that the enlargement of the lymphoid tissue goes on again after the initial operation, however contrary this may be to the teaching of the medical profession on this subject. Again, we must believe the *force of the mouth-breathing habit alone,* is tremendous, in some instances: that after all proper surgical measures have been resorted to, the habit persists. In this latter we need the conscientious co-operation of the medical profession. If mouth-breathing be purely a habit it is a serious enough one, and *we need to cure the habit.* Just how shall we do so? But the other points I have touched upon are even more vital, I think. We want you gentlemen of the medical profession to be more keenly alive to the situation than ever before.

We are prepared and competent to restore the normal balance and harmony of the dental arches, and of the face of the patient, and we want you to know that this work also promotes the normal development of the nose. But we are looking ahead to the future, to the permanence of our work. Unless you help us, good and strong, we shall feel, as I admit we have in the past, that our progress is being hindered because of the pathological nasal or post-nasal conditions which persist in

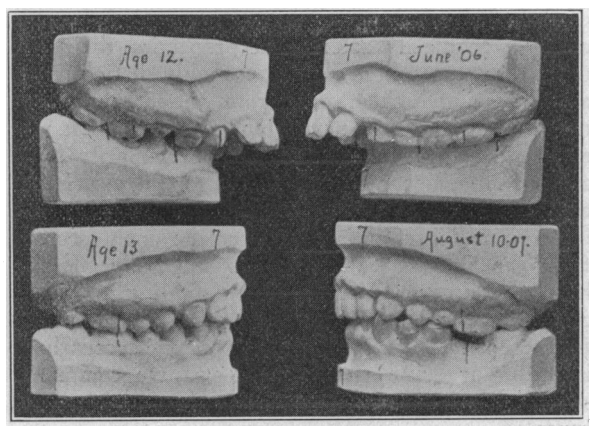

Fig. 4. Models showing Malocclusion of teeth of patient whose photographs appear above. Models of corrected case also shown.

spite of all ordinary treatment by the physician.

May not some of our hygienists be near the truth, when they hold that hypertrophy of the lymphoid tissue in the pharynx,—and of the tonsils,—is due to wrong living? Due to bad dietetics and bad hygiene? They contend that the cutting away of the abnormal tissues is but a method of temporizing,—that the growth returns with continued wrong living.

Dr. Osler, after reciting methods of dealing with adenoids, finishes the chapter by saying: "Throughout the entire treatment attention should be paid to hygiene and diet: cod-liver oil and the iodide of iron may be administered with benefit." If this same attention were given to hygiene and diet at the outset, might not these evils be much mitigated?

I have endeavored to show how vitally close is the relation of the work of the physician or rhinologist with that of the orthodontist. There is a chain of cause and effect at work, involving the pharynx, the tonsils, the teeth and the nose, and until we appreciate the absolute necessity of active co-operation, failure, instead of success, will be frequently in evidence on both sides.